**MEDIA MEDIKA MUDA**
Volume 4, Nomor 4, Oktober 2015
Online : http://ejournal-s1.undip.ac.id/index.php/medico



# HEAD AND NECK CANCER TRENDS IN SEMARANG: AN ANALYSIS OF ASR AND ASCR

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## ABSTRACT

**Background**: The sustainable incidence data of Head and Neck Cancer is poorly described in Indonesia. There was no large-scale epidemiological study of head and neck cancer in Indonesia, especially in Semarang and surrounding areas. Whereas, by knowing the distribution of sex and age in the incidence data could indicate changes in patterns of cancer that occur every year.
**Aim**: This research aim to determine the distribution of head and neck cancer based on anatomic site, age and sex by counting the Age Standardization Rates (ASR) and Age Standardization Cancer Ratio (ASCAR) score
**Methods** : This research was a retrospective observational descriptive study using the medical records of Head and Neck Cancer Patients from Anatomical Pathology Laboratory of Kariadi Central Hospital / Medical Faculty Diponegoro University and Waspada Laboratory in 2010-2014. Collected data were tabulated manually using Microsoft Excel and analyzed and presented descriptively in table or graphic form
**Result**: The incidences of head and neck cancer were varies every year. The nasopharyngeal cancer seems to be the most common head and neck cancer diagnosed during 2010- 2014. ASCR and ASR in male and female were different in certain head and neck cancer cases.
**Conclusion**: The incidence of head and neck cancer varies every year. Nasopharyngeal cancer is the most cases diagnosed in this period in both male and female The patients who diagnosed head and neck cancer mostly are men. Age Standardization used in this research allows this research's result to be compared with the result in another population which used the same method.
**Keywords** Head and Neck Cancer, ASR, ASCR

## ABSTRAK

**HEAD AND NECK CANCER TRENDS IN SEMARANG:AN ANALYSIS OF ASR AND ASCR**
**Latar Belakang:** Data insiden Kanker Kepala dan Leher di Indonesia yang berkelanjutan sangat jarang dijelaskan. Belum ada studi epidemiologi berskala besar kanker kepala dan leher di Indonesia, khususnya di Semarang dan sekitarnya. Padahal, dengan mengetahui distribusi jenis kelamin dan usia dalam data insidensi bisa menunjukkan perubahan pola kanker yang terjadi setiap tahunnya.
**Tujuan**: Penelitian ini bertujuan untuk menentukan distribusi kanker kepala dan leher berdasarkan letak anatomi, usia dan jenis kelamin dengan menghitung skor *Age Standardized Rates (ASR)* dan *Age Standardized Cancer Ratio (ASCR).*
**Metode**: Penelitian ini merupakan penelitian retrospektif deskriptif observasional dengan menggunakan rekam medis pasien Kanker Kepala dan Leher dari Laboratorium Patologi Anatomi RSUP dr. Kariadi / Fakultas Kedokteran Universitas Diponegoro dan Laboratorium

Waspada selama periode 2010- 2014. Data yang terkumpul ditabulasi secara manual menggunakan Microsoft Excel dan dianalisis dan disajikan secara deskriptif dalam tabel dan bentuk grafik.
**Hasil**: Insidensi kanker kepala dan leher bervariasi jumlahnya setiap tahun. Kanker nasofaring menjadi kanker kepala dan leher yang paling umum dijumpai selama 2010- 2014. Terdapat perbedaan skor ASCR dan ASR pria dan wanita pada tiap jenis kasus kanker kepala dan leher tertentu.
**Kesimpulan**: Kanker nasofaring adalah kasus yang paling banyak didiagnosis pada periode ini baik pada laki-laki maupun perempuan. Sebagian besar pasien yang didiagnosis menderita kanker kepala dan leher adalah laki-laki. Standardisasi umur yang digunakan dalam penelitian ini memungkinkan hasil penelitian ini untuk dibandingkan dengan populasi lain yang menggunakan metode yang sama.
**Kata kunci** *Kanker Kepala dan Leher, ASR, ASCR*

## INTRODUCTION

Head and Neck Cancer is a complex of heterogeneous malignancies affecting different sites in the head and neck region. The malignancies in mouth, lip, tongue, salivary gland, paranasal sinus cavity, larynx, and pharynx are included in this group. Although the incidence of Head and Neck Cancer tend to be less frequent than the other cancer, the morbidity caused by this cancer might not be able to be neglected. Head and Neck Cancer causes several morbidity which affecting appearance and function (i.e. swallowing, speaking and breathing) and consequently patients may experience depression and poor nutrition.[1]

Previous study conducted at Kariadi Hospital Semarang Indonesia, showed that the incidence of Head and Neck Cancer during January 1$^{st}$ 2001 – December 31$^{th}$ 2005 were 448 cases. Similar to other study, the ratio of men diagnosed with head and neck cancer is about 5:4, higher than women, and nasopharyngeal cancer is the most cases diagnosed in this period.[5]

However, the sustainable incidence data of Head and Neck Cancer is poorly described in Indonesia. The statistics of cancer are often conducted using the relative frequencies which cannot describe population at risk in epidemiological study, because of age and sex are not described in the data. Whereas, by knowing the distribution of sex and age in the incidence data can also indicate changes in patterns of cancer that occur every year.

While previous studies have described trends in Head and Neck Cancer at some countries or hospital level, there are no large-scale epidemiological studies of head and neck cancer in Indonesia, especially in Semarang and surrounding areas. Therefore, this study tries

to describe trends in rates of Head and Neck Cancer regionally with focusing on anatomic site, sex, and age. The anatomic site classifications used in this research are based on International Classification of Disease (ICD 10th) which makes the difference with the previous research.

## RESEARCH METHOD

This research was a retrospective observational descriptive study. The data is taken from the medical records of Head and Neck Cancer Patients from Anatomical Pathology Laboratory of Kariadi Central Hospital / Medical Faculty Diponegoro University and Waspada Laboratory which fulfilled the inclusion criteria i.e. medical records which diagnosed Head and Neck Cancer accompanied with data of sex and age of patient and addressed in Semarang and its surrounding area (city of Semarang, Semarang regency, Demak, Grobogan and Pemalang).

Data for total population for each sex in the several age group used in this research were from Badan Pusat Statistik (BPS). The standard population used in this research was from World Health Organization.

Collected data were tabulated manually using Microsoft Excel and analyzed and presented descriptively in table or graphic form. ASR and ASCR were calculated using direct methods as the formula shown below.

Age Standardized Rate (ASR) can be formulated by:[10,13]

ASR = Total (nx/y.px) Wx for 100.000 population

Where nx : number of new certain head and neck cancer at age x
y : number of year on which rates are based
Px : number of person in population at age x in the same sex
Wx: World standard population at age x

Age Standardized Cancer Ratio (ASCAR) can be formulated by:[10,13]

ASCR = Total (nx/Nx) Wx

Where nx: Number of new head and neck cancer cases at certain age group
Nx: Number of new head and neck cancer cases at all age group
Wx: World standard population at certain age group

## RESULT

The data obtained from the medical records of head and neck cancer patients between 2010 and 2014 in Kariadi Central Hospital and Waspada Laboratory Semarang resulting:

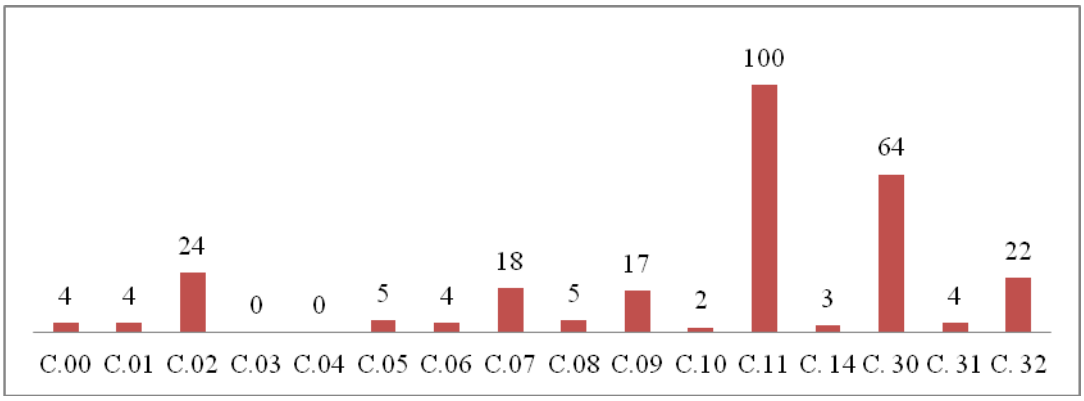


**Figure 6.** The Incidence of Head and Neck Cancer in Semarang during 2010- 2014

Where :

C.00 : Malignant Neoplasm of Lip

C.01 : Malignant Neoplasm of Base of Tongue

C.02 : Malignant Neoplasm of Other and Unspecified Parts of Tongue

C.03 : Malignant Neoplasm of Gum

C.04 : Malignant Neoplasm of Floor of Mouth

C.05 : Malignant Neoplasm of Palate

C.06 : Malignant Neoplasm of Other and Unspecified Parts of Mouth

C.07 : Malignant Neoplasm of Parotid Gland

C.08 : Malignant Neoplasm of Other and Unspecified Major Salivary Glands C.09 : Malignant Neoplasm of Tonsil

C.10 : Malignant Neoplasm of Oropharynx

C.11 : Malignant Neoplasm of Nasopharynx

C.14 : Malignant Neoplasm of Other and Ill- defined Sites in The Lip, Oral Cavity and Pharynx

C.30 : Malignant Neoplasm of Nasal Cavity and Middle Ear

C.31 : Malignant Neoplasm of Accessory Sinuses

C.32 : Malignant Neoplasm of Larynx

From the figure above, nasopharyngeal cancer, coded with C.11 is the most cases diagnosed in this period. It is followed with malignant neoplasm of nasal cavity and middle ear (C.30). It is similar with the previous research conducted by Onggo Wiliyanto that nasopharyngeal cancer is the most cases diagnosed of head and neck cancer.

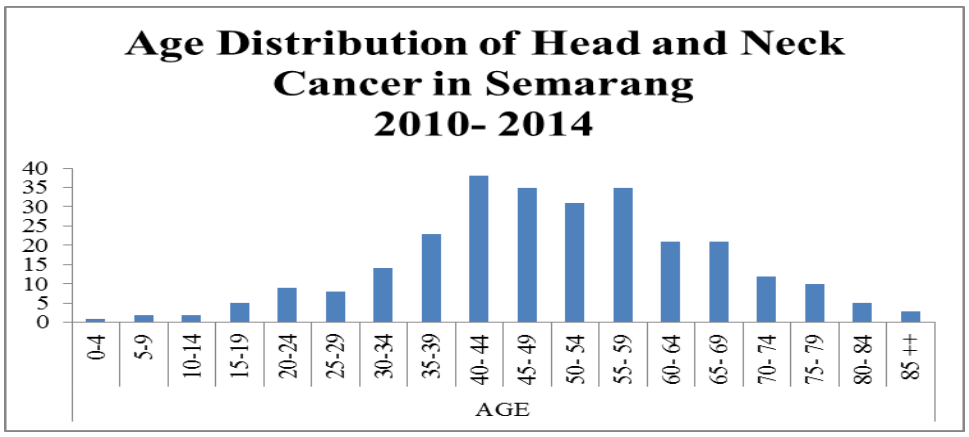


**Figure 7.** Age Distribution of Head and Neck Cancer in Semarang during 2010-2014

Based on the figure above, the age of Head and Neck Cancer patients diagnosed in Semarang between 2010- 2014, distributed mostly in age group 40-44 and followed with age group 45- 49.

**Table 20.** Top 5 Head and Neck Cancer in Males in Semarang during 2010-2014

| Rank | Cancer Type | Total Cases* | Percentage** (%) | ASR*** |
|---|---|---|---|---|
| **1** | Malignant Neoplasm of Nasopharynx (C.11) | 66 | 24 | 0,4 |
| **2** | Malignant Neoplasm of Nasal Cavity and Middle Ear (C.30) | 34 | 12 | 0,2 |
| **3** | Malignant Neoplasm of Larynx (C.32) | 22 | 8 | 0,13 |
| **4** | Malignant Neoplasm of Tonsil (C.09) | 13 | 5 | 0,08 |
| **5** | Malignant Neoplasm of Other and Unspecified Parts of Tongue (C.02) | 12 | 4 | 0,07 |

*Total cases of Head and Neck Cancer in males during 2010- 2014

**Percentage of All Head and Neck Cancer Cases during 2010- 2014

***The average of ASR in male during 2010- 2014

**Table 21.** Top 5 Head and Neck Cancer in Females in Semarang during 2010- 2014

| Rank | Cancer Type | Total Cases* | Percentage** (%) | ASR*** |
|---|---|---|---|---|
| **1** | Malignant Neoplasm of Nasopharynx (C.11) | 34 | 12 | 0,3 |
| **2** | Malignant Neoplasm of Nasal Cavity and Middle Ear (C.30) | 30 | 11 | 0,2 |
| **3** | Malignant Neoplasm of Other and Unspecified Parts of Tongue (C.02) | 12 | 4 | 0,1 |
| **4** | Malignant Neoplasm of Parotid Gland (C.07) | 7 | 3 | 0,04 |
| **5** | Malignant Neoplasm of Tonsil (C.09) | 4 | 1 | 0,03 |

*Total cases of Head and Neck Cancer in females during 2010- 2014

**Percentage of All Head and Neck Cancer Cases during 2010- 2014

***The average of ASR in females during 2010- 2014

## DISCUSSION

For most people, cancer is likened to be the most feared disease since it could affect anyone. For this reason, a cancer registry is important to be done. Cancer registry is an activity to collect and classify the cancer patient data in an effort to determine the incidence of cancer in certain populations and provide a framework for assessing and controlling the effects of cancer on society.[15]

From the explanation above, cancer registry can be used widely in many aspects. It can be used for epidemiology research, planning and monitoring health programs, and also might be implicated further in the cancer prevention and control programs.

There are three type of cancer registry that are laboratory- based, hospital- based, and population- based. The laboratory-based cancer is the most method used in Indonesia. As this method, cancer patient data are collected from some anatomical pathology laboratories which have high accuracy in cancer diagnosis. This method was also used in this research.

The hospital-based cancer registry has the wider scope of recording cancer incidence, because the anatomical pathology diagnosis is not the only source to count the incidence of cancer. In hospital, there are some supporting tools, instead of anatomical pathology laboratory, to diagnose a cancer. So, it can be found more cancer data with using this method.

Meanwhile, the best method for cancer registry is population- based. This method ideally, should visit door to door to find the cancer patients, but this is hard to do. So, another method is by collecting data from medical records of general practitioners, doctor specialist, some community health center and the health department in the population area.[15]

In the incidence of cancer, age has a great influence on the risk of cancer, proven by the age distribution mostly in the middle-age and rarely in the children. It might because the prolonged exposure to carcinogens during life or the habitual risk which provoke cancer, such as smoking, alcohol, etc. But, it does still need the further studies to learn more about the potential and dominant risk factor beside age, in the incidence of cancer.

In this research, the age of Head and Neck Cancer patients distributed mostly in 40-44 years old. It almost the same with the previous research conducted by Onggo Wiliyanto, that the age distribution of Head and Neck Cancer patients in Kariadi Hospital Semarang during 2001- 2005 mostly in 40- 49 years old. So, it could be said that trends of head and neck cancer is in age group 40-44.

In addition, sex is known has the influence in the incidence of cancer as well. This research found that there was 175 cases in males and 101 cases of Head and Neck Cancer. This is similar with the other studies that males tend to be more likely develop Head and Neck Cancer than females.

Because some population have the different age structure for each sex, it is necessary to have an age standardization to solve the difficulties in comparing rates between populations with different age distribution. Age Standardization Rates (ASR) Direct Method is using World Standard Population which classified in several age groups. Furthermore, it would be possible to compare the data of one population to another which also used the same method.

And it cannot be denied that this research has also the limitation in the recording of all head and neck cancer incidence in Semarang, such as the limitations in the permission to take the data from all the pathology centers in Semarang and the presence of missing data.

In this research which using secondary data, there are some medical records diagnosed with head and neck cancer that must be excluded because of incomplete data (there is no age/ sex/ address), further it referred as missing data. This missing data can reflect the performance and quality of health care institutions in managing the patient data, although this is not an absolute and dominant component in the assessment, but this missing data made the incidence data became less precise. The total of missing data is 41, 31 missing data are from Kariadi Central Hospital and 10 missing data are from Waspada Laboratory.

## CONCLUSION AND SUGGESTION

The incidence of head and neck cancer varies every year. Nasopharyngeal cancer is the most cases diagnosed in this period in both male and female. The patients who diagnosed head and neck cancer mostly are male and distributed mostly in the age group 40- 44.

Age Standardization used in this research allows this research's result to be compared with the result in another population. ASR could also describe the different trends of Head and Neck Cancer between males and females as could be seen in the table below.

It also important to study more about the other factors that might be influence the incidence of head and neck cancer which varies every year. The involvement of biopshycosocial factor in the incidence of cancer can be discussed further. For Anatomical Pathology Laboratory of Kariadi Central Hospital and Waspada Laboratory, to improve the quality in managing patient data, so there is no missing data anymore. And if this research will be continued in the upcoming year, the available data will be more complete and accurate.

## ACKNOWLEDGEMENT

The writer would like to Thank God, all praises to Allah for the blessing and His grace so this research could be done. Dr. dr. Awal Prasetyo, M.Kes, Sp.THT-KL as the advisor who always giving advice and suggestion during this research. All the staff of Medical Record in Anatomical Pathology Laboratory of Kariadi Central Hospital and Waspada Laboratory Semarang who have helped to complete the data for this research. And others who are not

mentioned one by one who have helped the writer to finish this research, I hope that God will recompense their kindness to everyone who had helped the writer. Hopefully, this research will be useful for all of us.

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